POLICY RESEARCH WORKING PAPER 2230

Bankruptcy Reorganization through Markets

Auction-based Creditor Ordering by Reducing Debts (ACCORD)

Donald B. Hausch
S. Ramachandran

Financial reorganization under bankruptcy reduces a firm's debts to serviceable levels through negotiations overseen by courts. Academics have suggested using markets for such negotiations, giving equity holders and junior claimants call options to buy the firm back from senior creditors.

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Summary findings

Hausch and Ramachandran further develop such a market-based approach for situations in which claimants are severely cash-constrained and there is good reason for existing owner-managers to remain in control.

Under the ACCORD scheme — Auction-based Creditor Ordering by Reducing Debts — creditors remain creditors but form a queue, to be serviced in sequence from the firm's operating cash flows.

Creditors bid for their position in this queue. Those accepting greater *proportionate* reductions in the face value of their claims (perhaps most pessimistic about the firm's prospects) are placed ahead of the others.

A preexisting hierarchy of claims is honored by having claimants bid for their positions within the relevant segment of the queue. No one in the queue, including owners (who are last), is paid anything until the (reduced) debts of the first in line are *fully* discharged. The queue then moves up and the next claimant in line is serviced.

Deferred creditors, who must wait their turn for the firm's operating cash surpluses, are not junior creditors in the conventional sense.

Hausch and Ramachandran determine equilibrium bidding strategies, showing that the firm's aggregate debts would be reduced to a more serviceable level. This would improve the incentives of the firm's owner-managers, who remain in control, to operate the firm efficiently. Economic resources would thus be better used, and losses already incurred would be efficiently and quickly allocated among creditors.

Hausch and Ramachandran suggest that ACCORD would be appropriate for East Asia, where, despite new bankruptcy laws, inexperienced courts are unlikely to nudge creditors into a quick negotiated agreement nor to be able to cope with systemic bankruptcy. Moreover, when the government is a major unsatisfied creditor, whose agents may not act in the taxpayers' best interests, market-based solutions might remove political interference from restructuring decisions. Neither owners nor creditors would be worse off than they are now.

This paper — a joint product of the Private Sector Development Department, and Poverty Reduction and Economic Management Sector Unit, East Asia and Pacific Region — is part of a larger effort in the region to understand and improve corporate restructuring and governance. Copies of the paper are available free from the World Bank, 1818 H Street, NW, Washington, DC 20433. Please contact Lili Tsang, room MC8-140, telephone 202-458-0516, fax 202-522-1784, email address ltsang@worldbank.org. Policy Research Working Papers are also posted on the Web at www.worldbank.org/research/workingpapers. The authors may be contacted at dhausch@bus.wisc.edu or sramachandran@worldbank.org. November 1999. (35 pages)

Bankruptcy Reorganization through Markets:

Auction-based Creditor Ordering by Reducing Debts (ACCORD)

by

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I. Introduction

The basic approach in bankruptcy has creditors negotiate with debtors and with each other to reorganize the liabilities if the firm is viable, or to liquidate the firm in an orderly manner if it is not. Courts supervise the process to prevent individual creditors from "grabbing" assets or garnering proceeds out of turn and to prevent holdouts from getting an unfair advantage. Countries differ in their bankruptcy procedures but all have their critics.[2]

The 1978 U.S. Bankruptcy Code, for instance, allows firms to be either liquidated under Chapter 7 or reorganized under Chapter 11. Two common criticisms of Chapter 7 are that (1) viable firms may be needlessly dismantled, and (2) sales proceeds would be meagre when the most likely buyers of industry-specific assets are buffeted by the same adverse economic developments as the bankrupt firm (Shleifer and Vishny 1992). Chapter 11 is a structured negotiation between current managers (representing owners, but subject to the principal-agent problem) and the creditors, with the outcome being a different payment stream than what was originally contracted. To limit holdouts stemming from the free-rider problem, courts allow the original debt contracts to be breached if there is substantial, albeit less than unanimous, creditor approval of the revised terms. Chapter 11 is often criticized as (1) too lengthy with high legal and administrative costs, (2) having a pro-management bias, and (3) violating the absolute priority of claims (because secured creditors cannot immediately seize assets and payouts to junior claimants are common despite reductions in the claims of senior claimants).

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[1] University of Wisconsin, Madison and the World Bank, respectively. Readers of an earlier paper should note that the ACCORD scheme described here is simpler than the earlier TADA and uses the private information that creditors reveal about firm values in their bids.

[2] Berkovitch and Israel (1999) show that a country's optimal bankruptcy procedure is a function of the ability of creditors to gain information about the firm and the ability of managers to exploit their private information.

Bebchuk (1988) proposed a market-based alternative to a negotiated bankruptcy. Using Black and Scholes' original insight that equity is a call option on the firm's assets with an exercise price equal to the debt that is owed, Bebchuck proposes working up the hierarchy of claims. Starting with the most junior claimant (namely, equity), each claimant class is given a choice of either paying off all the more senior claimants in full or having its own claims extinguished. Whichever class pays off all the more senior claimants become the firm's new owners. Bebchuk's proposal respects the absolute priority of claims and results in an all-equity firm.[3]

Bebchuk's proposal allows only existing claimants (shareholders and creditors) to bid. Outsiders may run the firm better thereby raising its value; so Aghion, Hart and Moore (1992, hereafter AHM) proposed allowing outsiders to also bid and to specify different ways the existing claims would be paid: creditors may propose restructuring the existing debt, while an outside bidder (e.g. a firm in a similar business) may offer to merge and replace debt with equity in the merged entity. Different classes of claimants would value the bids differently (e.g. senior claimants would tend to prefer offers with a low variance to the returns), and AHM propose "homogenizing" the claimants (possibly through Bebchuk's scheme), so that the various offers could be voted on.

While AHM's proposal is more suitable when outsiders could run the firm better, it may require bidders to pay in cash and it may involve cash payments to achieve homogenized bidders prior to the vote.[4] Thus, this procedure may be adversely affected by systemic bankruptcy, since potential bidders are often cash constrained and capital markets are typically functioning imperfectly, and because the scale of the financial distress simple precludes replacing many of the managers.

East Asia's Systemic Problems

Firms in the crisis countries of East Asia are heavily indebted. They were highly leveraged before the crisis, and leverage has increased since. Debts were often denominated in foreign currency

[3] The firm could borrow through a separate transaction that could occur simultaneously if all the claimants in that class agree to accept *pro rata* fractions of each class of liabilities in the desired new financial structure.

[4] Although, Hart, La Porta Drago, Lopez-de-Silanes, and Moore (1997) offer a variation on AHM that accommodates cash-constrained claimants.

even for non-exporters. The economic crisis was accompanied by sharp rises in interest rates and falls in their currencies' value in the foreign exchange market; but even if interest rates and exchange rates were restored to their pre-crisis levels, the debts of many firms have now mushroomed to levels which may never be serviceable.

Table 1

Salient Corporate Statistics

	Indonesia	*Korea*	*Malaysia*	*Philippines*	*Thailand*
1998 to 1996 Real GDP ratio	0.88	1.00	1.00	1.05	0.92
1998 GDP	$105 b	$309 b.	$69.4 b.	$68 b.	$121 b.
Nominal Exchange Rate ratio: mid-1999 to mid 1997	2.75	1.31	1.5	1.43	1.44
Capacity utilisation[1] (mid-1998)	58%	71%	65%	68%	60%
Total Corporate Debt (b. US$ equivalent)	118.0	444.0	120.2	47.5	195.7
Of which external	67.1	64	40	23.3	32.5
...domestic debt (b. US$ equiv).	50.9	380.0	80.2	24.2	163.2
Banking Sector's External Debt (b US$)	50.3	72.4	23.0	17.8	46.8
Debt to Equity ratio 1996	2.0	3.5	1.1	1.4	2.4

[1] World Bank survey of firms (mid-1998)

The firms have been generally well run. While total factor productivity appears to have been declining in recent years, making East Asia's growth less miraculous than was earlier believed, few doubt that firms' managers (who are very closely linked to the controlling owners) are generally competent and able to adapt to the new situation: there are vigorous attempts to restore the firms' profitability. Even so, debts that cannot be serviced must be renegotiated, and this is not occurring rapidly. The *status quo* erodes the owner-managers' incentives to operate the firm efficiently because any increase in firm value accrues entirely to the creditors. Put differently, the owners' call options are now far "out of the money" because the exercise price far exceeds the asset value of the firm.

Countries have promulgated new bankruptcy laws or amended old ones and are improving their courts' functioning. It is nevertheless clear that the courts are — and should be — designed to deal with

the normal mortality rate of firms, not those stemming from an economy-wide scale ("systemic crisis"). Furthermore, it would be foolhardy for most creditors to take over and try to operate the affected firms: they lack the skill and cannot oversee the managers that do. Managers have valuable firm-specific human capital and are beholden (and often related) to the owners.

What is needed therefore is a quick way for the debts to be reduced to sustainable levels without disrupting existing management which is restructuring operations in response to the changed markets. Bankruptcy negotiations would stall if owner-managers fear a loss of control, and courts are too inexperienced to nudge discussions along. Furthermore, governments have intervened heavily in the banking system and their agencies are now major creditors to the privately owned firms. There is a considerable risk that debt negotiations could take on a political color. Market based alternatives to court proceedings are therefore very attractive.

The Need for a Different Scheme

The existing proposals in the literature, ingenious though they are, may be unsuited to the East Asian circumstances. Credit markets work poorly especially now: domestic banks are largely bankrupt (governments are restructuring them) and access to foreign credit has been disrupted. With potential domestic bidders cash constrained, large-scale sales to foreigners could generate a backlash of public sentiment, especially in countries with recent and unpleasant colonial experiences. Even if these problems were surmountable, outsiders (whether domestic or foreign) face an acute information asymmetry problem: firms have been remarkably coy about divulging their finances to their own creditors, let alone to unrelated parties even if they were potential bidders. Schemes relying on outside bidders (as in the AHM proposal) or having junior claimants raise additional cash (as in the Bebchuck proposal) are therefore unworkable.

*The Proposed **ACCORD***

This paper develops a *non-cash* auction based scheme called the ACCORD (for **A**uction based **C**reditor **O**rdering by **R**educing **D**ebts). Creditors bid the reduction in the claims they are willing to accept, and their bids arrange them in a queue to be serviced in sequence. Those willing to accept the

greatest *proportionate* reduction are placed ahead of the others in the queue. Creditors are then *serviced sequentially* from the operating cash surplus of the firm which owners continue to control and operate.

Note that all creditors remain creditors; but those that forgive proportionately more have their (reduced) debts *fully* discharged before those who forgave less. Creditors who believe the firm to be worth little would be willing to forgive a larger proportion of their claim to be sure of obtaining at least something before the funds run out. Conversely, creditors who think that the firm's difficulties are only temporary would forgive little, and wait patiently (further behind in line) for their turn to receive payments. The original equity-holders (i.e. the most junior claimants) do not bid and continue to own and operate the firm, obtaining any residual that may be left. The details of the administrative arrangements — who conducts the auction, safeguards against breaches in rules etc. — are outlined in section IV.

The ACCORD may be thought of as auctioning places in a creditor queue that is being formed *within* an existing hierarchy of claims. Creditors essentially bid by the fraction of debt they forgive and face a trade-off: the more they forgive, the sooner (and so more likely) they will be repaid. The bidder incentives and the resulting equilibrium are explored in the paper, and some variants of this basic scheme are outlined.

The Structure of the Paper

After this introduction, ***a non-technical reader could quickly proceed to section IV for a discussion of the implementation of the scheme.*** **Section II** describes the basic version of the ACCORD when equally senior creditors share a common belief about the probability distribution surrounding the value of the firm. The equilibrium bidding strategies are derived, and the resulting equilibrium is shown to reduce debts to a more serviceable level. The equilibrium outcome of ACCORD gives the owners a positive expected residual return which, unlike the *status quo,* restores their incentive to operate the firm efficiently (i.e. their call options on the firm would *not* be way out of the money).

Section III discusses extensions to allow for an initial seniority structure of the debt and for creditors with heterogeneous beliefs about the value of the firm. It also considers possible collusion

among the creditors and how to treat the government when it is a creditor. The ACCORD scheme is shown to be quite robust to collusion or mistaken bids.

Section IV outlines some implementation issues to illustrate how the ACCORD could be introduced. As the scheme requires no discretionary rulings, and information that allows for collusion or fraud is not available to a single person who may be vulnerable to threats or favors, any shortcomings of the courts would not impede ACCORD's working. This is why auctions have great merit. Countries like Thailand have demonstrated their ability to conduct auctions (the Financial Restructuring Agency sold the loan portfolios of the finance companies that were closed in 1997).

II. The ACCORD Scheme: *"Auctions Speak Louder than Words"*

Under the proposed ACCORD scheme, creditors arrange themselves in a queue to be serviced in sequence, *but remain creditors* (i.e. they do not become residual claimants, or owners). Unlike the servicing of debts with the usual seniority structure (who all receive periodic interest payments), under ACCORD, *only the creditor who is at the head of the queue gets paid.* Only when the (reduced) debts of the first in line are fully discharged, and the queue moves up does the next person receive any payment. Creditors therefore wait in line to step up to the head and only then be paid.

Each creditor bids the reduction in the face value of the debt that they are willing to accept, and their claim is reduced by this proportion. The reduced claims are arranged in order of the proportion reduced, with the resulting queue headed by the creditor with the greatest *proportionate reduction.*[5] Thus, creditors essentially choose between accepting a smaller fraction of their (original) debt but receiving the payments sooner (i.e. with a higher probability) or waiting longer for more. A creditor who offers no reduction (or does not bid at all) is placed at the back of the queue, but ahead of the owners who as equity-holders, continue to control and operate the firm and obtain any residual after all the debts are discharged.

[5] If there are different classes of creditors initially, the ordering of the classes is unchanged and the bids within each class are arranged according to the reductions bid.

Two Illustrative Examples

Consider a firm whose assets have an expected market value of $100 and two creditors are each owed more than $50, so that the firm is in financial distress. In this section, we consider the case when both creditors are equally senior and hold a common belief about the firm's value. In the next section, we extend the discussion to initial debt structure with different creditor seniority and to heterogeneous beliefs about the value of the firm.

We now consider two examples to illustrate bidding strategies under ACCORD. In both examples, the creditor who forgives more of the debt becomes the senior claimant and the original equity-holders remain residual claimants.

Example 1: No Uncertainty

With no uncertainty, the firm's assets are surely worth $100, and each creditor is trying to get as much of this as he can. Let the bid b_i represent the new face value of the debt that creditor i=1,2 offers in the auction, so that a lower bid means more forgiveness. The unique pure-strategy Nash equilibrium is $b_1 = b_2 = 50$ (i.e., both offer a new face value of 50, which is 50 percent forgiveness). As a result, the junior claimant is determined by some tie-breaking rule and, whether junior or senior, a creditor receives a certain payoff of 50.

While it is easily seen that $b_1 = b_2 = 50$ is a Nash equilibrium, it is less clear why this equilibrium is unique. To show that there are no other pure-strategy equilibria, consider an equilibrium candidate in which, say, creditor 1 bids $b_1 \neq 50$. First suppose that $b_1 > 50$. Then creditor 2 optimally responds with $b_2 = b_1 - \varepsilon$, in which case b_1 is not a best strategy for bidder 1. Second suppose that $b_1 < 50$. Then creditor 2 optimally responds with $b_2 = 100 - b_1$, in which case b_1 is not best for bidder 1.[6]

Example 2: With Uncertainty

[6] Note how the continuum of equilibria to the Divide-the-Dollar Game is reduced to a unique equilibrium with the introduction of our seniority structure.

We first show that Example 1's equilibrium no longer holds with the introduction of uncertainty, and then derive the mixed strategy equilibrium bid.

Suppose that the value of the firm could be low (L) or high (H) with $H > L > 0$. Note that since each event is equally likely and the firm's expected value is 100, $H = 200 - L$. To see that the earlier bidding strategy would not be equilibrium, consider two cases when creditor 1 chooses $b_1 = 50$.

First, suppose $L \geq 50$. Bidding $b_2 = 50$ will result in a tie, and creditor 2 will be randomly selected to be either senior or junior creditor. If senior, creditor 2 receives 50 with certainty. If junior, creditor 2 receives an expected return of $\frac{1}{2}(L - 50) + \frac{1}{2}(50) = \frac{1}{2}L < 50$. Thus, creditor 2's average return from also forgiving 50 percent is strictly less than 50. Creditor 2 prefers bidding $b_2 = 100$ (i.e., no forgiveness), for an expected return as junior claimant of $\frac{1}{2}(L-50) + \frac{1}{2}(H-50) = 50$.

The second case has $L < 50$. Creditor 2's expected return from bidding $b_2 = 50$ is $\frac{1}{2}(L) + \frac{1}{2}(50) < 50$ if chosen to be senior creditor and $\frac{1}{2}(0) + \frac{1}{2}(50) = 25$ if junior. Thus, creditor 2 expects a return strictly less than 50. Creditor 2 prefers to bid $b_2 = 100$, which guarantees junior status and an expected return of $\frac{1}{2}(0) + \frac{1}{2}(100) = 50$.

A pure strategy equilibrium does not exist for this example. If creditor 1 forgives a lot, then creditor 2 prefers to forgive nothing; but if creditor 1 forgives little, then creditor 2 will forgive slightly more to become the senior creditor. We now determine the mixed-strategy equilibrium.

Let a bid b represent the new (reduced) face value of the debt that is offered by the creditor (i.e., level of forgiveness = original face value – b). Define:

$$G_1(b;c_1) = 2 + \frac{c_1}{\sqrt{2b - L}},$$

$$G_2(b;c_2) = c_2 + \frac{b}{L},$$

$$G_3(b;c_1,c_2) = 2 + \frac{c_2}{\sqrt{2b-100}} - \frac{c_1}{4\sqrt{2b-100}} \cdot \sin^{-1}\left[\frac{500 - 3L - 4b}{300 - 3L}\right],$$

$$G_4(b;c_2,c_3) = \frac{400 + 2L - b}{3L} + c_2 + \frac{c_3}{\sqrt{2b - 200 + 2L}},$$

and $$G_5(b;c_1,c_4)=\frac{3}{2}+\frac{c_4}{\sqrt{2b-200+2L}}-\frac{c_1}{2\sqrt{2b-200+2L}}\cdot\sin^{-1}\left[\frac{600-5L-4b}{200-L}\right].$$

Also, define L* as the solution to:

$$2\sqrt{\frac{2L-100}{400-5L}}+\sin^{-1}\left[\frac{500-7L}{300-3L}\right]=2\sqrt{2}+\sin^{-1}(1/3).$$

(I.e., L*≈76.95)

The symmetric Bayesian-Nash equilibrium is for each creditor to independently draw b from an interval $[\underline{b},\bar{b}]$ according to a cumulative probability distribution, G(b). Since the other creditor will not bid less than $\underline{b}$, there is no benefit to bidding more than H-$\underline{b}$. In fact, we show that $\bar{b}$ = H-$\underline{b}$. Thus, $\underline{b}$ < ½H < $\bar{b}$. There are four cases of L to consider in specifying the equilibrium: i) $\underline{b}$ < ½H < $\bar{b}$ < L; ii) $\underline{b}$ < ½H < L < $\bar{b}$; iii) L < $\underline{b}$ < L < ½H < $\bar{b}$; and iv) L < $\underline{b}$ < ½H < $\bar{b}$. The symmetric Bayesian-Nash equilibrium is as follows:

Case 1: L* < L < 100

$$G(b)=\begin{cases} G_1(b;c_1) & \text{for b 0 } [\underline{b},½H] \\ \\ G_3(b;c_1,c_2) & \text{for b 0 } [½H,\bar{b}], \end{cases}$$

where {c1,c2,$\underline{b}$,$\bar{b}$} solves $G_1(\underline{b};c_1)=0$, $G_1(½H;c_1)=G_3(½H;c_1,c_2)$, $G_3(\bar{b};c_1,c_2)=1$, and $\underline{b}+\bar{b}$=H.

Case 2: 200/3 ≤ L ≤ L*

$$G(b)=\begin{cases} G_1(b;c_1) & \text{for b 0 } [\underline{b},½H] \\ G_3(b;c_1,c_2) & \text{for b 0 } [½H,L] \\ G_5(b;c_1,c_3) & \text{for b 0 } [L,\bar{b}], \end{cases}$$

where $\{c_1,c_2,c_3,\underline{b},\bar{b}\}$ solves $G_1(\underline{b};c_1)=0$, $G_1(½H;c_1)=G_3(½H;c_1,c_2)$, $G_3(L;c_1,c_2)=G_5(L;c_1,c_3)$, $G_5(\bar{b};c_1,c_3)=1$, and $\underline{b}+\bar{b}$=H.

Case 3: 100/(1+$2^{1/3}$) ≤ L ≤ 200/3

$$\begin{cases}$$

$$G(b) = \begin{cases} G_1(b;c_1) & \text{for } b \in [\underline{b},L] \\ G_2(b;c_1,c_2) & \text{for } b \in [L,\tfrac{1}{2}H] \\ G_4(b;c_2,c_3) & \text{for } b \in [\tfrac{1}{2}H,H-L] \\ G_5(b;c_1,c_4) & \text{for } b \in [H-L,\ \bar{b}], \end{cases}$$

where $\{c_1,c_2,c_3,c_4,\underline{b},\bar{b}\}$ solves $G_1(\underline{b};c_1)=0$, $G_1(L;c_1)=G_3(L;c_1,c_2)$, $G_3(\tfrac{1}{2}H;c_1,c_2)=G_4(\tfrac{1}{2}H;c_2,c_3)$, $G_4(H-L;c_2,c_3)=G_5(H-L;c_1,c_4)$, $G_5(\bar{b};c_1,c_4)=1$, and $\underline{b}+\bar{b}=H$.

Case 4: $0 < L \leq 100/(1+2^{1/3})$

$$G(b) = \begin{cases} G_2(b;c_2) & \text{for } b \in [\underline{b},\tfrac{1}{2}H] \\ G_4(b;c_2,c_4) & \text{for } b \in [\tfrac{1}{2}H,\bar{b}], \end{cases}$$

where $\{c_2,c_4,\underline{b},\bar{b}\}$ solves $G_2(\underline{b};c_2)=0$, $G_2(\tfrac{1}{2}H;c_2)=G_4(\tfrac{1}{2}H;c_2,c_2)$, $G_4(\bar{b};c_2,c_4)=1$, and $\underline{b}+\bar{b}=H$.

The proof is in Appendix I; but we now consider several interesting features of the equilibrium. *First*, in all four cases, the creditors are indifferent among the bids on $[\underline{b},\bar{b}]$. Bidding $\underline{b}$ guarantees the creditor both senior status and, for cases 1-3, guarantees a payment of $\underline{b}$, since it can be shown that $L > \underline{b}$ for these three cases. In case 4, $L < \underline{b}$, so expected payment is $\tfrac{1}{2}L + \tfrac{1}{2}\underline{b}$. Figure 1 illustrates the range of bids, $[\underline{b},\bar{b}]$, as L varies from 0 to 100. *Second*, the maximum value of $\bar{b}$ is 111.5. Thus, our analysis implicitly assumes that the original face value of the debt owed to each creditor exceeds \$111.50 (because creditors cannot be permitted to bid a negative level of forgiveness). If each creditor is owed less than \$115.50, however, the analysis needs to be slightly modified, but the results are qualitatively the same. *Third*, for L close to zero (which means H is near 200), bids are in a small range around 100, which is roughly the value of each creditor's claim were it known that the outcome would be H with certainty. Thus, in effect, the creditors essentially ignore the L outcome, because its value is so low, and focus on

the H outcome. For L = 100, the firm is worth 100 with certainty (since H=100, too), so, from Example, creditors bid 50.

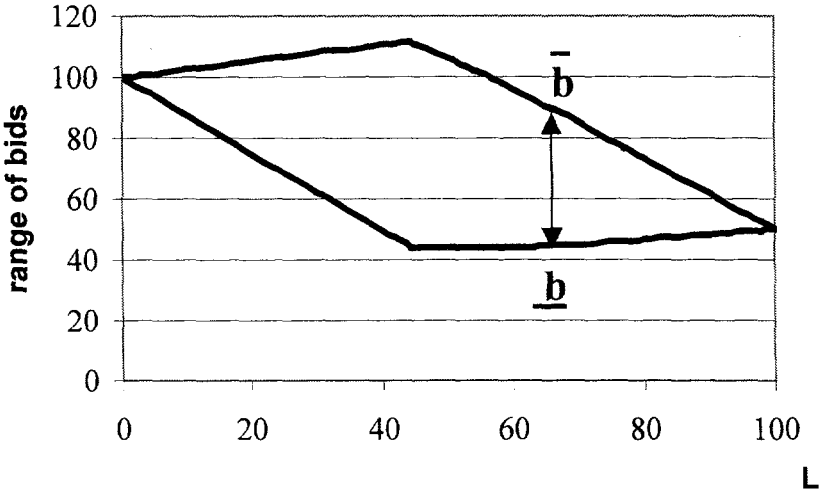

Figure 1: For Example 2, the range of bids, [$\underline{b}$, $\bar{b}$], as L varies from 0 to 100. (Recall that H = 200 – L, so H varies from 200 to 100.)

Since the expected value of the firm is ½(L+H), absolute priority requires that each creditor receive ¼(L+H). It can be shown that, for all cases 1-4, each creditor's expected return is less than ¼(L+H), though. As explained above, the reason for this is that if a creditor bids so as to realize the full residual return in the event that they become the junior claimant, this emboldens the other creditor to forgive less also, which leaves less for the first creditor.

In equilibrium, *since the creditors realize less than the expected value of the firm, the owner-manager's equity position has a positive expected value*. This is an important outcome because it provides the owners with an incentive to operate the firm efficiently. Figure 2 illustrates that expected value as L varies from 0 to 100 (and H varies from 200 to 100). Notice that as L increases from 0, the owner-manager's expected return increases. Beyond about L=55, though, this expected return decreases. To understand this reversal, consider the extreme case of L=0 and H=200, for which the variance of the

value is highest. In this case, the creditors each bid b=100 (i.e., no forgiveness), for an expected return of 100 with probability ½, which leaves zero expected return for the owner-manager. Bidding b=100 is precisely what the creditors would have bid if the value of the firm was known to be 200 with certainty. As discussed above, the creditors' bidding ignores the event that the firm value is zero, since there will be no value to realize in that event. By comparison, consider an example where the value is, say, uniform on [L,H]. Then as L approaches zero, the variance of the value increases, but we speculate that bidding does not focus exclusively on the possible high values. Thus, we speculate that our example's result that the owner-manager's expected return may decrease as uncertainty increases is partially an artifact of our example.

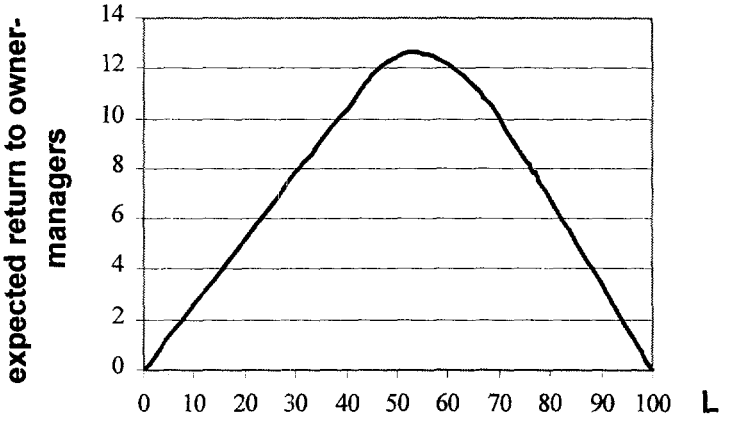

Figure 2: For Example 2, the expected return to the owner-managers following the ACCORD scheme, as L ranges from 0 to 100. Since the expected value of the firm is 100 for all values of L, the expected return to creditors = 100 – expected return to owner-managers.

Despite the owner-manager's expected residual return, the equilibrium forgiveness is not sufficient to guarantee that the new debt level will be sustainable. This is immediate since, as noted above, $\bar{b} > H/2$, so it is possible for the new level of debt to exceed even H. Also, Figure 1 shows that $\underline{b}$

> ½L. Thus, equilibrium forgiveness is guaranteed to be insufficient in the event that the realization of the firm value is L. (On the other hand, $\underline{b} < \frac{1}{2}H$, so the new level of debt may be sustainable.) In practice, bankruptcy reorganization cannot guarantee that a firm will not subsequently experience financial distress (just as a firm that has not experienced financial distress in the past cannot guarantee that financial distress will not occur in the future). We discuss this issue at greater length in Section III.

III. Additional Considerations in ACCORD

The earlier section showed that the ACCORD scheme results in debt forgiveness and that the owner-manager could expect a positive residual return, which provides the vital incentive to operate the firm efficiently. This result arises from the uncertainty over the value of the firm. We now extend these results in several ways.

A) Pre-Existing Seniority of Claims

Example 2 is now altered to include junior creditors who have claims in addition to the two (senior) creditors. Since the payoffs to the two senior creditors do not depend on the junior creditors' claims, the optimal bidding strategy of senior creditors (described in Section II) would be unchanged. We now examine the junior creditor's bidding strategy.

Let S represent the sum of the senior creditors' bids. As was noted, $L \leq 2\underline{b} \leq S$ and H may exceed S. Consequently, the junior creditors face a residual value of 0 or max{H-S,0}, depending on whether the realized firm value is L or H, respectively. Based on the equilibrium bidding from Section II, junior creditors will bid b = ½max{H-S,0}, which *eliminates all positive expected residual returns for the owners*.

It is Example 2's two-point distribution assumption that entirely eliminates the owners' expected residual returns. If the distribution of firm values were continuous, there will be a narrower (but not degenerate) distribution of returns available to the junior creditors, which would lead them to bid some forgiveness, which in turn would offer a positive expected residual return to the owners.

For a more complex initial seniority structure and a continuous distribution of firm value, all senior creditor classes who are certain that they would be repaid, would bid no forgiveness. Only in the class where there is some probability —no matter how small — of *not* being fully paid, would bids involve forgiveness as in Section II. Creditors in yet lower levels will also bid some forgiveness (when firms' values have a continuous distribution), thereby always leaving owners with some residual expected returns.

This pattern of progressively smaller but positive expected returns to the progressively more junior creditors violates absolute priority (except that it is voluntary); but it helps the functioning of ACCORD. In any class, *creditors need both uncertainty and some expected return* as an incentive to compete for a better position in their segment of the queue; otherwise, they have no incentive to forgive, which would adversely affect the outcome of ACCORD. Alternatively, if someone (government?) could extinguish the claims of the very junior creditors, owners would be assured of an even greater positive expected return.

B) Creditors with Private Information

Section II assumed that the creditors share a common belief about the probability distribution of the value of the firm. In practice, creditors may have different information and may interpret the same information about the firm differently. Introducing private information in Appendix II, a variation of the ACCORD scheme has an equilibrium in which creditors with more optimistic views of the firm's prospects forgive more than those who are more pessimistic. Thus, the most senior (junior) creditors will be those who are most pessimistic (optimistic). This outcome is efficient since there are no mutually beneficial trades of positions. If, on the other hand, those most pessimistic became the junior creditors, there are gains from junior and senior creditors switching positions.

C) What if Forgiveness were Insufficient?

As noted with Example 2, ACCORD may not generate sufficient forgiveness to guarantee that subsequent financial distress will never occur. This is a common occurrence with the bankruptcy procedures that are used in practice, too. Gilson (1995) reports that one quarter to one third of financially

distressed firms that reorganize re-experience financial distressed within a few years. The expectation of another opportunity to reorganize could alter bidding strategies: creditors would bid a smaller forgiveness, thereby increasing the likelihood of subsequent bankruptcy. On the other hand, creditors realize that such uncertainty is detrimental to the firm, and may bid with this knowledge.

Our model could be extended to incorporate in the creditors' bids the likely increase in the value of the firm (viz., a rightward shift in the probability distribution) because of the restoration of owner-manager incentives; but this is not attempted here.

D) ***Bidder Collusion***

Collusion is a concern in any auction. If creditors in Example 2 could perfectly collude, the bids would be $b_1 = b_2 = \frac{1}{2}H$, giving them the entire value of the firm (regardless of whether L or H was realized) and leaving the owner-managers with nothing. This is not an equilibrium, of course, since each creditor has an incentive to bid slightly more forgiveness to become senior creditor (i.e. realize $\min\{L,\frac{1}{2}H\}$ if state L occurs, rather than $\frac{1}{2}L$ from collusion.). Hence the importance of the detailed bidding procedures that inhibit collusion, as discussed in section IV on implementation.

Several aspects of our setting suggest that collusion may not be a serious problem. First, perfect collusion can extract only the positive expected residual return available to the owner-managers. Second, it can be counterproductive to extract too much of the residual value from the owner-managers; so the larger creditors are unlikely to collude. Third, the distrust among creditors may be sufficient to preclude collusion, especially when the set of creditors differ for each firm participating in the ACCORD auctions.

E) Government-creditor and Noncompetitive Bids

Many East Asian governments now hold (directly or indirectly) substantial claims against financially distressed private firms. The governments have taken over, or substantially control the domestic banks whose non-performing loans far exceed their capital. Banks' claims on private, financially distressed firms (whether residing in the intervened banks, or in bank restructuring agencies, or asset management companies) are substantial and are not controlled by the government. While the government agent could bid like other creditors, given its size and vulnerability to making politically

motivated bids, we suggest that these claims be reduced by the weighted average[7] of the other bids. Such "non-competitive bids" (to use the misleading term from the auction for U.S. Treasury Bills) would avoid politicizing the auction, and may also be permitted for other small creditors who may be at an informational disadvantage.

F) Non-Participating Creditors

If a creditor does not bid, one response would be to treat this as a refusal to forgive and place him at the end of the relevant segment of the queue. Knowing this, other creditors would be emboldened to forgive less because they are certain to be ahead of the inactive creditor. The result, depending on how many non-bidders there may be, could be insufficient reduction in the aggregate debts of the firm.

An alternative would be to treat non-bidders like the non-competitive bidders, and reduce their claims by the weighted average forgiveness. While this may be reasonable, it may increase the incentive to corrupt the auction process by providing an incentive for bids "to go missing."

IV. Implementation and Conclusions

A common reaction to unusual solutions is "Has it been done before?" and the absence of a direct precedent offers little comfort that it would work as promised. Unprecedented problems (systemic bankruptcy on this scale) cannot have tested solutions; but while the ACCORD is still a proposal, auctions of analogous importance and complexity are increasingly widespread. The Federal Communications Commission in the United States allocated the rights to spectrum use inefficiently for decades to radio and television stations, and subject to political interference; but it auctioned a part of the spectrum suitable for cellular telephone use in 1996. There is now an extensive literature that both describes the important role that theoretical work on simple auction models played in the design of these extremely complex auctions and examines their success (e.g., Cramton 1995, 1997).

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[7] It could also be that the government's claims and queue positions are assigned to match perfectly the proportionate reductions and queue positions of the other creditors. Thus, rather than the government's claims appearing as a bulge in the middle of the queue, its claims could be uniformly spread over the queue.

An important advantage of the ACCORD is to prevent the politics from distorting the renegotiations of debts. East Asian governments and courts already have a reputation for being susceptible to the influence of powerful and wealthy business interests. With the taxpayers bearing much of the losses (through the government guarantee of banking deposits), some of the well-connected debtors may enjoy an unwarranted reduction in debts in negotiations with government agents (e.g. the asset management companies or bank restructuring agencies which hold the claims). Even if this did not occur, the fear of such an accusation would stymie any bureaucrat negotiating unpaid claims. An auction protects the honest civil servant because the government-controlled claims could be reduced by the weighted average of other bids.

The ACCORD does not require a complex bureaucracy, and the auction could be conducted either by the bankruptcy courts or outside of them. While the details should be tailored to the circumstances of each country, it may be useful to outline the procedure.

An Example

The example describes the process conducted under the aegis of the bankruptcy court, although the judge need not be familiar with either auction theory or bankruptcy negotiations. The rules of participating in the ACCORD scheme and the auction procedures (bidding forms, deadlines etc.) are announced. The court appoints (1) an ACCORDer and (2) a Recorder whose roles are far more modest than that of a conventional administrator or receiver under bankruptcy. Each could therefore handle several scores of firms. Splitting the oversight role between the two greatly reduces the likelihood that the scheme could be subverted through corruption. Only one of them, perhaps the ACCORDer, needs to be an official of the court; the recorder could be an accounting firm with an incentive to maintain an international reputation for honesty and trustworthiness.

There is no coercion involved: only if the firm and a significant minority of creditors agree, should it be included in the ACCORD scheme. A refusal would have no adverse repercussions — beyond the existing "threat" of conventional bankruptcy filing. Also, undertaking the preparatory steps is

non-binding; it is only just before the auction is conducted that the parties commit themselves irrevocably to the ACCORD rules.

Preparatory Steps

Any of the parties involved — a creditor (e.g. a bank restructuring agency that has inherited the claim), an owner, or the firm's managers — could approach the bankruptcy judge to suggest the firm for the ACCORD scheme. This does ***not*** constitute a filing for bankruptcy, and the court's role at this stage is simply that of a clearinghouse for information.

The court writes to the firm's managers explaining the ACCORD scheme and its rules and asking them if they are interested to submit (1) a list of creditors and the amounts they are owed, and (2) a business plan within 30 days. The letter is only copied to the party who suggested the firm (so he knows his request is heeded) but there is no publicity as with a bankruptcy filing. The firm's owner-managers would likely prefer the ACCORD scheme to conventional financial reorganisation under bankruptcy where their ownership may be diluted and they may lose control. So they may agree and provide the court with the creditor list and the business plan. They may even contact the major creditors directly to canvass support for the plan and ensure that the requisite majority approves it so the auction could proceed.

If the firm declines, or fails to respond by the deadline specified, the matter ends; but if the firm submits a plan, the court merely conveys it to all the creditors involved without examining its viability or fairness. As in a conventional financial reorganisation, the creditors may form a committee to meet the firm's managers and discuss the plan; but the court would not be involved in this. As creditors may not approve a skimpy plan, the firm's owners have an incentive to supply information to the creditors' satisfaction. To alert any claimants whom the firm did not list, the court announces (i.e. publishes in the official gazette) that it would conduct an auction for the firm under ACCORD rules (detailed below) in 2 weeks time if (a) there are no disputes about the creditor list and amounts owed and (b) the requisite

super-majority[8] of creditors approve the plan. After the requisite 2 weeks, the judge ascertains (a) and (b) in a hearing. If she is not satisfied (perhaps new claimants emerge etc.), the matter ends there with no prejudice against any party. In other words, they are free to either live with the *status quo* or file any suit under the bankruptcy or other laws, or to attempt entering the ACCORD again later. If the judge is satisfied, then the parties enter the ACCORD scheme.

The Binding ACCORD rules

It is at this stage, and before the auction is conducted, that the judge binds the parties to the ACCORD rules. All creditors[9] forfeit their right to file bankruptcy or liquidation petitions for (say) 5 years. Owners agree to forgo any cash dividends or payouts during this period and, if the reduced debts are not fully discharged by the end of the 5 years, to automatic liquidation.[10] The automatic liquidation clause protects creditors against the firm accumulating cash surpluses (which may have genuine business reasons) instead of servicing the debts of those in the creditor queue. Box 1 explains how the auction could be conducted, the outcome announced, and other details which make it harder for participants to collude.

[8] The requisite supermajority would be the same as that required for a cram down under the bankruptcy law: generally a simple majority within each class and two-thirds or three-quarters of the aggregate. This would also bind any new creditors who subsequently lend the firm money (suitable clauses could be inserted into the loan contract).

[9] Since the requisite super-majority needed for any cram down under conventional bankruptcy have approved both the plan and the decision to enter the ACCORD scheme, this can be made binding on the dissenters.

[10] Depending on the company law, a shareholder meeting may have to approve the management decision. The meeting may also be required to approve a curtailed role for the Board of Directors and managers to protect them against shareholder suits (although few countries are as litigious as the United States).

Box 1: Some Procedural details

Bidding: Creditors submit sealed bids to the recorder who opens only the outer envelope. Inside is (1) a slip with the bidder's name (address etc.) and (2) another sealed envelope containing the bid which he does not open. The claim's priority and face value is on the outside of this inner envelope. Creditors may submit multiple envelopes bidding different reductions for different face values (which also helps hide his identity because the list of original claims is publicly known).

The Recorder notes the bidder's name and face value of the claim in his records and allots a unique identifying code which is stamped on the slip and on the outside of the inner envelope (which does not otherwise identify the creditor). The Recorder checks the face value off against the publicly available list of original claims so no one submits bids in excess of what they have. The bidder gets the slip back as proof of the bid (it has his name and identifying code).

When the date for accepting bids ends, the Recorder also submits envelopes on behalf of creditors who did not bid (an identifying code and amount outside with a *zero* reduction bid inside). So there are sealed envelopes totaling the aggregate claims outstanding (publicly known), and all these unopened inner envelopes are passed on to the ACCORDer.

The Auction: The ACCORDer opens the inner envelopes on the appointed day in public and collates the auction results. The aggregate reduction in debt is announced immediately. Each creditor can verify that his bid is untampered, his position in the queue and (if he keeps track of all bids) the (reduced) amount owed ahead of (and behind) him; but because of the identifying codes, he does not know the position of others in the queue or how much each forgave (making bid collusion difficult). The ACCORDer knows the codes of those in line, but not their true identity. The Recorder (who is not present at the opening) knows the codes and the creditor identity, but not the auction result of any creditor (aggregate data are public). The firm (i.e. owner) knows the *original* claims of each creditor and the aggregate reduction in debt, but knows neither the order nor the individual amounts of the *deferred* claims.

The ACCORDer sends a written confirmation of each bidder's result (in a sealed envelope with the identifying code outside) through the Recorder (who forwards it to the creditor).

Periodic Payments: The firm makes periodic payments to an escrow account which the Recorder administers. The ACCORDer, told the cash balance, in turn tells the Recorder whom to pay (identifying code) and how much. The recorder sends each creditor a quarterly statement of how much is outstanding ahead of him, so they know how the queue is moving.

Secondary Market: The deferred claims are transferable; but as they are not uniform, trading will only be sporadic with negotiated rather than quoted prices. The latest quarterly update forms the basis for the price, but a trade requires the seller to register the change in the claim ownership with the recorder. The secondary trade does not concern the ACCORDer or the firm.

The deferred debts accrue interest at specified rates[11], and whenever these debts have been fully discharged, the court declares that the firm is no longer under its aegis and it is free to operate unfettered. If the (reduced) debts have not been fully discharged by the end of the 5 years specified, the firm is liquidated automatically. (This too could be by auction with the owners and creditors free to bid.)

Limiting the ACCORDer's or the judge's discretion, both before and after the auction, makes success less vulnerable to any shortcomings of the court. The judge only rules on disputes of fact, not questions of fairness. Once creditors approve the plan and bid in the auction, only fraud or egregious

[11] Interest accrual does not benefit creditors *per se* (for the bids compensate for this); but if interest did not accrue, firms would have an incentive to accumulate cash and only pay just before the 5 year deadline to avoid liquidation.

misconduct not mundane business decisions (should some asset have been sold?) would come up before the court.

One likely dispute is if the firm accumulates cash without paying any of the deferred creditors. While many owners are unlikely to needlessly accumulate a cash horde, some may; but cash is often needed to operate the business, and perhaps even expand. Having the judge adjudicate this would generate endless disputes which would tie the courts and the parties involved into knots. Instead, the automatic liquidation protects creditors would have a right to this cash. Furthermore, creditors may trade their claims at any time[12]; so regardless of their position in the queue, creditors could cash in their claims (albeit at a price different from their reduced claim).

While firms may not distribute cash (except as specified to the head of the creditor queue), they are free to raise additional funds through asset sales, new equity or borrowings. These *new claims cannot come ahead of existing claims*, and may not be serviced before all the deferred claims outstanding are fully discharged. Any new equity would be in the same class as the old equity (at the very end of the queue); but a new loan would be behind all other loans (although ahead of the equity). Note this difference from conventional bankruptcy filing (where new loans come before pre-filing loans); and this is because the old creditors have *already* reduced their claims.

Putting new borrowings at the back of the creditor queue would not be detrimental to the continued operations of the firm or disadvantageous to the new creditor. Recall that the firm is not obligated to make any cash payment; so its ability to finance its continued operations is considerably greater. The firm may also discharge all of its outstanding debts at any time; so if the new lenders or investors find the restrictions onerous, the firm could use the proceeds to discharge the outstanding debts to the deferred creditors and operate unfettered by the rules of the ACCORD.

It is not onerous for the ACCORDer to calculate interest (which must be near market rates) and this permits loans in foreign currency to accrue interest at a different rate.

[12] When they do trade, they have to inform the auditor so the cheque could be sent to the correct claimant; but neither the firm nor the court need to be informed.

Some may think that the ACCORD hurts creditors because their debts are reduced without giving them an equity stake in the firm or curtailing the owners' control. In fact, creditors are hurt already because they have little legal protection (despite laws) and seem unable in most countries to seize control of the firm if they wanted to (not all creditors seek this). Offering the ACCORD as an *additional* alternative to existing bankruptcy could therefore only benefit creditors whose consent is still needed. The ACCORD would only be used if changing the current *status quo* were a positive sum game. Such a Pareto improvement could arise from eliminating the transaction costs and other inefficiencies of multi-party negotiations, with the inevitable but wasteful threats and bluffs, or from increased efficiency when the corporate debt overhang is eliminated.

Final Comments

The ACCORD differs from other market-based schemes proposed in the literature in that it specifically does *not* allow for a change in control or a dilution of ownership. Rather than ask, as Bebchuck does in his pioneering proposal, which class of creditors should get the firm, ACCORD assures the owners that they would continue to own and operate the firm, and instead has creditors bid against each other by trading off how much they are willing to collect against how long they are willing to wait.

This feature of ACCORD makes it particularly suited to the current East Asian situation where creditors are ill suited to operate the myriad firms that are staggering under large debts, but where creditor rights are not enforced in practice. If the owner-managers are assured of remaining in control, and their incentive to operate the firm were restored by reducing the face value of the debt claims, creditors would collectively be better off. The ACCORD scheme does just this by having them pool their information about how much debt each firm may be able to service through competing bids and reducing the debts accordingly.

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APPENDIX I: Proof of ACCORD Equilibrium

The ACCORD equilibrium of Example 2 has four cases. Since the proofs for the four cases are similar, we treat only case 1.

Suppose creditor 2 bids b_2 according to G(A) for $L^* < L < 100$. Bidding $b \leq \underline{b}$, creditor 1 realizes a certain return of b. Therefore, creditor 1 strictly prefers bidding $\underline{b}$ to any $b < \underline{b}$. For $b \in [\underline{b}, H/2]$, creditor 1's expected payoff is:

$$P(b) \equiv b(1-G(b)) + \frac{1}{2}\int_{b_2=\underline{b}}^{b}(L-b_2)dG(b_2) + \frac{1}{2}bG(b).$$

The first term deals with the event that creditor 1 bids less than creditor 2, becomes senior creditor, and is paid b whether the firm value is L or H. The second and third terms treat the event that creditor bids more than creditor 2, and so becomes the junior creditor. In the second term, the value is L so there is only L-b_2 available to creditor 1. In the third term, the value is H, which is sufficient to fully pay the junior creditor. Integrating by parts gives:

$$P(b) = b - \frac{1}{2}bG(b) + \frac{1}{2}(L-b)G(b) + \frac{1}{2}\int_{b_2=\underline{b}}^{b}G(b_2)db_2,$$

which reduces to:

$$P(b) = L - \underline{b} - \frac{c_1\sqrt{2\underline{b}-L}}{2} = \underline{b},$$

where the last equality follows since the condition $G_1(\underline{b}, c_1) = 0$ means that $c_1 = -2\sqrt{2\underline{b}-L}$.

Now consider $b \in [H/2, \bar{b}]$, in which case creditor 1's expected return is:

$$P(b) \equiv b(1-G(b)) + \frac{1}{2}\int_{b_2=\underline{b}}^{b}(L-b_2)dG(b_2) + \frac{1}{2}\left\{\int_{b_2=\underline{b}}^{H-b} bdG(b_2) + \int_{b_2=H-b}^{b}(H-b_2)dG(b_2)\right\}.$$

This expression differs from P(b) for $b \in [\underline{b}, H/2]$ in the last term. Here, if creditor 1 is junior and the value is H, then creditor 1 receives b only if b_2 is less than H-b; otherwise, creditor 1 receives H-b_2. Plugging in G(b) gives:

$$P(b) = 200 - H - \underline{b} + \frac{c_1}{2}\left(2\sqrt{H-L} - \sqrt{2H-L-2b} - \sqrt{2\underline{b}-L}\right) - \frac{\sqrt{2b-100}}{4}\left(4c_2 - c_1 \sin^{-1}\left[\frac{500-3L-4b}{300-3L}\right]\right)$$

$$+ \int_{b_2=H/2}^{b} \frac{4c_2 - c_1 \sin^{-1}\left[\frac{500-3L-4b_2}{300-3L}\right]}{4\sqrt{2b_2-100}} db_2 .$$

We first show that $P(H/2) = \underline{b}$ and then demonstrate that $P'(b) = 0$ for $b > H/2$.

$$P(H/2) = 200 - \sqrt{H-100}\left[c_2 - \frac{c_1}{4}\sin^{-1}(1/3)\right] - \underline{b} - H + \frac{c_1}{2}\left(\sqrt{H-L} - \sqrt{2\underline{b}-L}\right)$$

$$= 200 - \frac{c_1\sqrt{H-100}}{\sqrt{2}} - \underline{b} - H + \frac{c_1}{2}\left(\sqrt{H-L} - \sqrt{2\underline{b}-L}\right) \qquad \text{since } c_2 = c_1\left[\frac{1}{\sqrt{2}} + \frac{1}{4}\sin^{-1}(1/3)\right]$$

$$= 200 - \frac{c_1}{2}\sqrt{H-L} - \underline{b} - H + \frac{c_1}{2}\left(\sqrt{H-L} - \sqrt{2\underline{b}-L}\right)$$

$$= 200 - \underline{b} - H - \frac{c_1}{2}\sqrt{2\underline{b}-L}$$

$$= \underline{b} \qquad \text{since } c_1 = -2\sqrt{2\underline{b}-L}.$$

We now determine $P'(b)$ for $b \in [\underline{b}, H/2]$.

$$P'(b) = \frac{-c_1\sqrt{2b-100}}{\sqrt{(300-3L)^2 - (500-3L-4b)^2}} + \frac{c_1}{2\sqrt{2H-L-2b}}$$

$$= \frac{-c_1\sqrt{2b-100}}{\sqrt{(300-3L)^2 - (300-3L+200-4b)^2}} + \frac{c_1}{2\sqrt{2H-L-2b}}$$

$$= \frac{-c_1\sqrt{2b-100}}{\sqrt{-4(300-3L)(100-2b) - 4(100-2b)^2}} + \frac{c_1}{2\sqrt{2H-L-2b}}$$

$$= \frac{-c_1}{2\sqrt{400-3L-2b}} + \frac{c_1}{2\sqrt{400-3L-2b}} = 0.$$

Thus, $P(b) = \underline{b}$ for $b \in [\underline{b}, \bar{b}]$. $P(b) = \underline{b}$ for $b > \bar{b}$, too, since $\bar{b} = H - \underline{b}$ means that bidding $b > \bar{b}$ has the same return as bidding $b = \bar{b}$.

Finally, this analysis has assumed that $\underline{b} < L$, which occurs for $L > L^*$.

We have shown that, for case 1 and against creditor 2 using G(A), creditor 1 cannot do better than to bid on $[\underline{b}, \bar{b}]$. Thus, G(A) is a best response for creditor 1, which means that it is an equilibrium for both creditors to use G(A).

APPENDIX II: Variation of ACCORD for Publicly Traded Corporation

In this paper, ACCORD supposed that creditors remained creditors, but were ordered according to their proportionate forgiveness. Variations on this scheme are possible. We now consider one variation that may be appropriate for publicly traded corporations that have already addressed the separation between owners and managers. For the purposes of our analysis, we assume that all existing debt is at one seniority level.[13] This scheme differs from ACCORD since, as well as creditors reducing their claims, some creditors have their debt swapped for equity in the firm. We also suppose that, instead of creating a seniority level for every creditor, we can group several creditors into the same new seniority level. Finally, we deal with the original equity by giving them a fraction λ of the new equity. Initially we set $\lambda = 0$, which implies that the original equity claims are extinguished. The model is now described in more detail.

The Model

Consider the general symmetric model of Milgrom and Weber (1982), which has the private values and common value models as special cases. Suppose that there are n creditors of equal seniority and equal size. Suppose creditors $j = 1,\ldots,n$ each receives a real-valued signal X_j about the firm's value. Suppose also that the firm's value is influenced by a real-valued variable S. Let the actual value of the firm to creditor j be $V_j = v(X_j,X_{-j},S)$, with each creditor j's value symmetric in the other creditors' signals. Let $X=(X_1,\ldots,X_n)$ be distributed according to the probability density function f(X) and cumulative distribution function F(X), which are assumed to be symmetric in their arguments. The model's symmetry lets us consider the problem from the perspective of any creditor, say creditor 1. Let Y_m be the m^{th} lowest order statistic of $X_2,\ldots,X_n$ and define $\Lambda_m(x,y) / E(V_1|X_1=x,Y_m=y)$.

The auction identifies those creditors most willing to reduce their debt, and allows them to continue as creditors, while the remaining creditors (those most optimistic about the firm's prospects)

[13] Several levels of seniority can be accommodated by applying the original ACCORD scheme to all but the most junior creditors, with this variation of ACCORD applying only to the most junior creditors.

swap their debt for equity. This outcome can be accomplished through a variety of auction formats[14]. One consideration is whether creditors, despite their identical initial debt levels, should end up with different stakes in the firm, i.e., should there be a discriminatory *outcome* to a non-discriminatory process. A second issue is whether to exogenously specify how many would remain creditors (or this could also be made endogenous by making it depend on the bids submitted). For simplicity, we choose to exogenously specify that the "m" creditors with the lowest bids (i.e. those offering to forgive the most) would remain creditors and have the face value of their debt reduced to the bid of the $(m+1)^{st}$ lowest bid. Thus, all pessimists' *debts are reduced by the **same** proportion even if they offered to accept a greater reduction: ensuring the "voluntary" nature of the transaction.*

The other n-m creditors would each receive the same 1/(n-m) fraction of the firm's newly issued equity after the old owners are wiped out as under conventional bankruptcy. Thus, the auction establishes a uniform price for the m "winners" and another uniform price for the (n-m) "losers." The equilibrium bidding strategy is now described.

Proposition A1: The equilibrium bidding strategy for a bidder with signal x is:

$$b^*(x) = \int_{\underline{x}}^{x} \frac{v_m(\alpha,\alpha)}{n} dL(\alpha \mid x),$$

where $L(\alpha \mid x) = \exp(-\int_{\alpha}^{x} \frac{nf(s \mid s)}{F(s \mid s)} ds.$

Proof: See Appendix III.

We illustrate the equilibrium bidding strategy with an example.

Example A1: Consider the special case of the independent private values model with values uniform on [0,1]. Then $f(y|x) = f(y) = 1$ on [0,1], $\Lambda_m(x,y) = x$, and the symmetric equilibrium bidding strategy is:

$$b^*(x) = \frac{x}{n+1},$$

[14] It is envisioned that the auction would be conducted through sealed bids, and not open outcry as in an English auction. The now extensive literature on auction theory discusses how such details affect bidding strategies; but such details, though important, distract from the main results of the paper.

which is decreasing in n and independent of m.

The independent private values case in Example A1 is similar to the partnership dissolution problem of Cramton, Gibbons and Klemperer (1985 hereafter CGK). Efficient dissolution requires the partner with the highest value for the firm buying out the other partners. This occurs in our model with m = n-1, although the buyer (sole equity-holder) pays off the others, not with cash as in CGK, but with senior debt in the firm. If each creditor's private value is the deterministic amount that they can realize with the residual rights of control of the firm, then there is no difference between CGK and our model with m = n-1. If the private value is stochastic, as is only reasonable, there is a difference because the debt may not be fully repaid if the realized subsequent value of the firms were low while the equity-holder obtains the upside gain when the firm's subsequent value is high.

To capture the stochastic nature of the firm's value, the model above is altered to explicitly incorporate the uncertainty in payoffs, even with the auction process revealing the estimates of the parties. We also restrict ourselves to the common value model. (Thus, the value of the firm does not depend on who becomes the equity-holders.) Let V be a random variable representing the common value of the firm. Let g(A) and G(A) be the probability density and cumulative distribution functions of V. For simplicity, suppose that $g(A|X_1=x_1,\ldots, X_n=x_n)$ has strictly positive weight on and only on the interval $[\underline{V}, \overline{V}]$ for all vectors $(X_1=x_1,\ldots, X_n=x_n)$.

Corollary A1: For the common value setting with stochastic firm value, the symmetric equilibrium bidding strategy, $b^*(\cong)$, solves the following differential equation:

$$0 = -\int_{v=\underline{V}}^{mb^*(x)} \frac{v}{m} g(v \mid x, x)\, dv f_m(x \mid x) - b^*(x)\left[1 - G(mb^*(x) \mid x, x)\right] f_m(x \mid x)$$

$$+ \frac{1}{n-m} \int_{y_m=\underline{X}}^{x} \int_{v=mb^*(x)}^{\overline{V}} (v - mb^*(x)) g(v \mid x, x, y_{m+1})\, dv f_{m,m+1}(x, y_{m+1} \mid x)\, dy_{m+1}$$

$$- \frac{m}{n-m} \int_{y_m=\underline{X}}^{x} \int_{y_{m+1}=x}^{\overline{X}} \int_{v=mb^*(x)}^{\overline{V}} mb^{*\prime}(x) g(v \mid x, y_m, y_{m+1})\, dv f_{m,m+1}(y_m, y_{m+1} \mid x)\, dy_{m+1} dy_m .$$

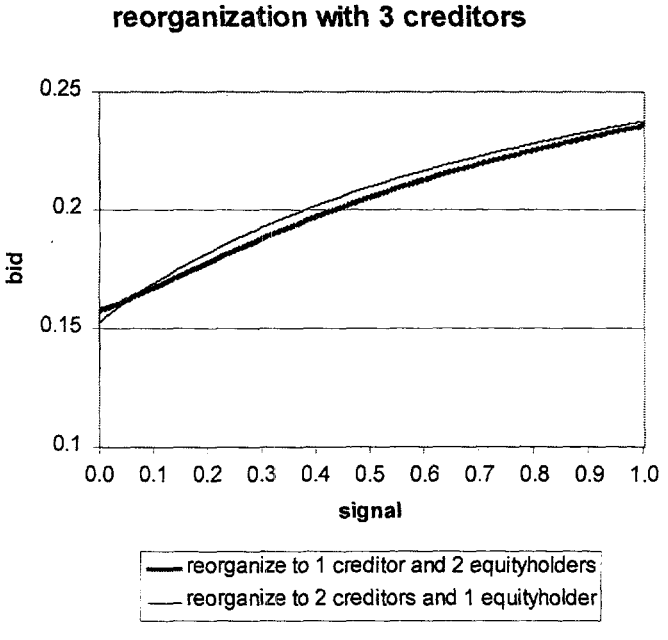
Proof: See Appendix III.

Since the properties of this equilibrium bidding strategy are difficult to ascertain in general from the differential equation above, we consider another example.

ExampleA2: Let n=3 and $x_j \sim U[0,1]$, with x_1, x_2, and x_3 independent. Suppose that

$$G(v \mid x_1, x_2, x_3) = v^{x_1+x_2+x_3} \qquad \text{for } v \ 0\ [0,1].$$

Therefore, the expected value of V is strictly increasing in x_j, j=1,2,3. We consider two cases: one in which the reorganization leads to 1 equity-holder and 2 creditors (m=2); and the other in which the reorganization leads to 2 equity-holders and 1 creditor (m=1). The equilibrium bidding strategies for these two cases are determined in Appendix III and illustrated in the figure below. In Example A1, b*(x) was independent of m. In this example, there is a dependence on m, but it is quite small, as is evident from the figure.



Keeping owners in control

Many East Asian firms are managed by their *controlling* (not necessarily majority) shareholders. Wiping out the owners' stake and making some creditors the firm's new owners may be an appropriate

allocation of losses, but it does not ensure the efficient operation of the firms. *First*, considerable institutional infrastructure (e.g. cultural norms and contract enforcement) is needed for a clean separation of ownership and management, and these takes many years to evolve. *Second*, there are considerable firm specific skills which the controlling shareholders and managers possess, and these may be lost if existing shareholders are wiped out. *Third*, creditor oversight is far simpler than owner oversight, and current creditors may lack the expertise to properly oversee the operations of the firm or evaluate the selection and proper remuneration of managers.

The basic version of the proposed scheme therefore needs to be amended, and there are two methods that may be used separately or together. The *first* method is to violate absolute priority and award the managers a fraction 8 of the equity in the firm, perhaps even setting $8 > 2$. This dilution of the equity makes exchanging one's debt for equity less attractive to creditors, *leading them to bid more aggressively to remain creditors*. Therefore, *the more existing owners' stake is preserved, the lower would be face value of reconstituted debt in equilibrium.*

More precisely, following closely proposition A1, the symmetric equilibrium bidding strategy for the general symmetric model when the managers are allocated 8 of the equity is:

$$b^*(x) = \lambda \int_{\underline{x}}^{x} \frac{v_m(\alpha,\alpha)}{n} dL(\alpha \mid x),$$

$$\text{where} \quad L(\alpha \mid x) = \exp\left(-\int_{\alpha}^{x} \frac{nf(s \mid s)}{\lambda F(s \mid s)} ds\right).$$

And for the case of the independent private values model with values uniform on [0,1], $f(y|x) = f(y) = 1$ on [0,1], and $\Lambda_m(x,y) = x$, this reduces to:

$$b^*(x) = \frac{\lambda x}{n+\lambda},$$

which is increasing in 8.

Appendix III: Proofs for Appendix II

Proof of Proposition A1: To determine the equilibrium of this game, let $b^*(\cong)$ be the symmetric bidding function and suppose that it is strictly increasing. Assuming that bidders 2,…,n use $b^*(\cong)$, we focus on bidder 1. Recall that $\Lambda_m(x,y) / E(V_1|X_1=x,Y_m=y)$ and define $\Lambda_m(x,y,z) / E(V_1|X_1=x,Y_m=y,Y_{m+1}=z)$. With estimate x and a bid of $b^*(\tilde{x})$, bidder 1's expected profit is:

$$\int_{y_m=\tilde{x}}^{\bar{X}} b^*(y_m) f_m(y_m \mid x)\,dy_m$$

$$+\frac{1}{n-m}\int_{y_m=\underline{X}}^{\tilde{x}}\int_{y_{m+1}=ym}^{\tilde{x}}[v_m(x,y_m,y_{m+1})-mb^*(y_{m+1})]f_{m,m+1}(y_m,y_{m+1}\mid x)\,dy_{m+1}\,dy_m$$

$$+\frac{1}{n-m}\int_{y_m=\underline{X}}^{\tilde{x}}\int_{y_{m+1}=\tilde{x}}^{\bar{X}}[v_m(x,y_m,y_{m+1})-mb^*(\tilde{v})]f_{m,m+1}(y_m,y_{m+1}\mid x)\,dy_{m+1}\,dy_m\,.$$

The first term represents the case in which creditor 1 is among the lowest m bidders, and therefore remains a creditor with debt repriced at the $m+1^{st}$ lowest bid, which is the mth lowest bid from the n-1 other bidders, i.e., $b^*(y_m)$. In the next two terms, creditor 1 becomes an equityholder, and does so without establishing the debt price in term two and by establishing that price in term three.

Differentiating with respect to $\tilde{v}$, setting $\tilde{v}=v$, and reducing gives $b^*(v)$ as the solution to

$$0 = -b^*(x)f_m(x\mid x) + \frac{1}{n-m}\int_{y_{m+1}=x}^{\bar{X}}[v_m(x,x,y_{m+1})-mb^*(x)]f_{m,m+1}(x,y_{m+1}\mid x)\,dy_{m+1}$$

$$-\frac{m}{n-m}b^{*\prime}(x)\int_{y_m=\underline{X}}^{x}\int_{y_{m+1}=x}^{\bar{X}}f_{m,m+1}(y_m,y_{m+1}\mid x)\,dy_{m+1}\,dy_m.$$

Since

$$\int_{y_{m+1}=x}^{\bar{X}} f_{m,m+1}(x,y_{m+1}\mid x)\,dy_{m+1} = f_m(x\mid x),$$

$$f_m(x|x) = \frac{(n-1)!}{(m-1)!(n-m-1)!}F(x|x)^{m-1}(1-F(x|x))^{n-m-1}f(x|x),$$

$$f_{m,m+1}(y_m, y_{m+1}|x) = \frac{(n-1)!}{(m-1)!(n-m-2)!}F(y_m|x)^{m-1}(1-F(y_{m+1}|x))^{n-m-2}f(y_m|x)f(y_{m+1}|x),$$

and $$\int_{y_m=\underline{X}}^{x}\int_{y_{m+1}=x}^{\overline{X}} f_{m,m+1}(y_m, y_{m+1}|x)dy_{m+1}dy_m = \frac{(n-1)!}{m!(n-m-1)!}F(x|x)^m(1-F(x|x))^{n-m-1},$$

then the differential equation for b*(x) can be reduced to

$$0 = -nb^*(x)f_m(x|x) + \int_{y_{m+1}=x}^{\overline{X}} v_m(x,x,y_{m+1})f_{m,m+1}(v,y_{m+1}|x)dy_{m+1}$$

$$-\frac{(n-1)!}{(m-1)!(n-m-1)!}b^{*\prime}(x)F(x|x)^m(1-F(x|x))^{n-m-1}.$$

or

$$0 = b^{*\prime}(x)\frac{F(x|x)}{f(x|x)} + nb^*(x) - \frac{(n-m-1)\int_{y=x}^{\overline{X}} v_m(x,x,y)(1-F(y|x))^{n-m-2}f(y|x)dy}{(1-F(x|x))^{n-m-1}}.$$

$$= b^{*\prime}(x)\frac{F(x|x)}{f(x|x)} + nb^*(x) - E[v_m(X_1, Y_m, Y_{m+1})|X_1 = Y_m = x]$$

$$= b^{*\prime}(x)\frac{F(x|x)}{f(x|x)} + nb^*(x) - v_m(x,x).$$

Following Milgrom and Weber (1982) (where the only difference between their differential equation for the equilibrium of the first-price auction for a single good and our differential equation is the n coefficient to the b*(x) term), we can express the solution to this differential equation as:

$$b^*(x) = \int_{\underline{X}}^{x} \frac{v_m(\alpha,\alpha)}{n}dL(\alpha|x),$$

where $$L(\alpha|x) = \exp(-\int_{\alpha}^{x}\frac{nf(s|s)}{F(s|s)}ds.$$

It follows from Milgrom and Weber that b*(x) is increasing in x, as was assumed.

Proof of Corollary A1: Let $b^*(\cong)$ be the symmetric bidding function, suppose that it is strictly increasing, and assume that bidders 2,…,n use $b^*(\cong)$. With estimate x and a bid of $b^*(\tilde{x})$, bidder 1's expected profit is:

$$\int_{y_m=\tilde{x}}^{\bar{X}} \int_{v=\underline{V}}^{mb^*(y_m)} \frac{v}{m} g(v \mid x, y_m) dv f_m(y_m \mid x) dy_m + \int_{y_m=\tilde{x}}^{\bar{X}} \int_{v=mb^*(y_m)}^{\bar{V}} b^*(y_m) g(v \mid x, y_m) dv f_m(y_m \mid x) dy_m$$

$$+ \frac{1}{n-m} \int_{y_m=\underline{X}}^{\tilde{x}} \int_{y_{m+1}=y_m}^{\tilde{x}} \int_{v=mb^*(y_{m+1})}^{\bar{V}} (v - mb^*(y_{m+1})) g(v \mid x, y_m, y_{m+1}) dv f_{m,m+1}(y_m, y_{m+1} \mid x) dy_{m+1} dy_m$$

$$+ \frac{1}{n-m} \int_{y_m=\underline{X}}^{\tilde{x}} \int_{y_{m+1}=\tilde{x}}^{\bar{X}} \int_{v=mb^*(\tilde{x})}^{\bar{V}} (v - mb^*(\tilde{x})) g(v \mid x, y_m, y_{m+1}) dv f_{m,m+1}(y_m, y_{m+1} \mid x) dy_{m+1} dy_m.$$

The first two terms of this expression cover the case where the creditor remains a creditor. In the first term, the firm value is insufficient to fully repay its debt, in which case the m creditors share the entire firm value. The second term treats the case in which the firm can repay its repriced debt. In the last two terms of the expression, the creditor becomes an equityholder, with the $m+1^{st}$ lowest bid from the n-1 other creditors establishing the repricing of debt in term three and our creditor 1 setting that price in term four. Differentiating with respect to $\tilde{x}$, setting $\tilde{x}$=x, and reducing gives the indicated differential equation.

Equilibrium Bidding Strategy for Example A2:

Case 1: m=2

The differential equation for $b^*(x)$ is:

$$0 = 2x \int_{v=2b^*(x)}^{1} vg(v \mid X_1 = x, Y_2 = x) dv - 6xb^*(x)[1 - G(2b^*(x) \mid X_1 = x, Y_2 = x)]$$

$$- x \int_{v=0}^{2b^*(x)} vg(v \mid X_1 = x, Y_2 = x) dv - 4b^{*\prime}(x) \int_{y=0}^{x} (1 - G(2b^*(x) \mid X_1 = x, Y_2 = y)) y dy,$$

where

$$G(v \mid X_1 = x, Y_2 = y) = \frac{v^{x+y}(v^y - 1)}{y \ln(v)}.$$

The initial condition is that $b^*(0)=0$. The graph of $b^*(x)$ for m=2 appears below.

Case 2: m=1

The differential equation for $b^*(x)$ is:

$$0 = \int_{y_2=x}^{1} \int_{v=b^*(x)}^{1} (v - b^*(x)) g(v \mid X_1 = x, Y_1 = x, Y_2 = y_2) dv dy_2$$

$$- 2(1-x) \int_{v=0}^{b^*(x)} v g(v \mid X_1 = x, Y_1 = x) dv \; - \; 2(1-x) b^*(x)[1 - G(b^*(x) \mid X_1 = x, Y_1 = x)]$$

$$- b^{*\prime}(x) \int_{y_1=0}^{x} \int_{y_2=x}^{1} (1 - G(b^*(x) \mid X_1 = x, Y_1 = y_1, Y_2 = y_2)) dy_2 dy_1,$$

where

$$G(v \mid X_1 = x, Y_1 = y) = \frac{v^{x+y}(v - v^y)}{(1-y)\ln(v)}.$$

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